

SEQUENCE LISTING

<110> Rosanne M. Crooke  
Mark J. Graham

<120> ANTISENSE MODULATION OF MICROSOMAL TRIGLYCERIDE TRANSFER PROTEIN  
EXPRESSION

<130> ISPH-0591

<160> 137

<210> 1  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 1  
tccgtcatcg ctcctcaggg

20

<210> 2  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 2  
atgcattctg cccccaaggaa

20

<210> 3  
<211> 3392  
<212> DNA  
<213> Homo sapiens

<220>  
<221> CDS  
<222> (87) ... (2771)

<400> 3  
actccctcac tggctgccat tgaaagagtc cacttctcag tgactcctag ctgggcactg 60  
gatgcagttg aggattgctg gtcaat atg att ctt ctt gct gtg ctt ttt ctc 113  
Met Ile Leu Leu Ala Val Leu Phe Leu  
1 5

tgc ttc att tcc tca tat tca gct tct gtt aaa ggt cac aca act ggt 161  
Gly Phe Tyr Cys Cys Tyr Ser Ala Ser Val Ile Glu His Thr Thr Gly

ctc tca tta aat aat gac cg <sup>g</sup> ctg tac aag ctc acg tac tcc act gaa Leu Ser Leu Asn Asn Asp Arg Leu Tyr Lys Leu Thr Tyr Ser Thr Glu	30	35	40	209
gtt ctt ctt gat cg <sup>g</sup> ggc aaa gga aaa ctg caa gac agc gtg ggc tac Val Leu Leu Asp Arg Gly Lys Gly Lys Leu Gln Asp Ser Val Gly Tyr	45	50	55	257
cgc att tcc tcc aac gtg gat gtg gcc tta cta tgg agg aat cct gat Arg Ile Ser Ser Asn Val Asp Val Ala Leu Leu Trp Arg Asn Pro Asp	60	65	70	305
ggt gat gat gac cag ttg atc caa ata acg atg aag gat gta aat gtt Gly Asp Asp Asp Gln Leu Ile Gln Ile Thr Met Lys Asp Val Asn Val	75	80	85	353
gaa aat gtg aat cag cag aga gga gag aag agc atc ttc aaa gga aaa Glu Asn Val Asn Gln Gln Arg Gly Glu Lys Ser Ile Phe Lys Gly Lys	90	95	100	105
agc cca tct aaa ata atg gga aag gaa aac ttg gaa gct ctg caa aga Ser Pro Ser Ile Met Gly Lys Glu Asn Leu Glu Ala Leu Gln Arg	110	115	120	449
cct acg ctc ctt cat cta atc cat gga aag gtc aaa gag ttc tac tca Pro Thr Leu Leu His Leu His Gly Lys Val Lys Glu Phe Tyr Ser	125	130	135	497
tat caa aat gag gca gtg gcc ata gaa aat atc aag aga ggt ctg gct Tyr Gln Asn Glu Ala Val Ala Ile Glu Asn Ile Lys Arg Gly Leu Ala	140	145	150	545
agc cta ttt cag aca cag tta agc tct gga acc acc aat gag gta gat Ser Leu Phe Gln Thr Gln Leu Ser Ser Gly Thr Thr Asn Glu Val Asp	155	160	165	593
atc tct gga aat tgt aaa gtg acc tac cag gct cat caa gac aaa gtg Ile Ser Gly Asn Cys Lys Val Thr Tyr Gln Ala His Gln Asp Lys Val	170	175	180	185
atc aaa att aag gcc ttg gat tca tgc aaa ata gcg agg tct gga ttt Ile Lys Ile Lys Ala Leu Asp Ser Cys Lys Ile Ala Arg Ser Gly Phe	190	195	200	689
acg acc cca aat cag gtc ttg ggt gtc agt tca aaa gct aca tct gtc Thr Thr Pro Asn Gln Val Leu Gly Val Ser Ser Lys Ala Thr Ser Val	205	210	215	737
acc acc tat aag ata gaa gac agc ttt gtt ata gct gtg ctt gct gaa Thr Thr Tyr Lys Ile Glu Asp Ser Phe Val Ile Ala Val Leu Ala Glu	220	225	230	785
gaa aca cac aat ttt gga ctg aat ttc cta caa acc att aag ggg aaa Glu Thr His Asn Phe Gly Leu Asn Phe Leu Gln Thr Ile Lys Gly Lys	225	240	245	833

Ile Val Ser Lys Gln Lys Leu Glu Leu Lys Thr Thr Glu Ala Gly Pro			
250	255	260	265
aga ttg atg tct gga aag cag gct gca gcc ata atc aaa gca gtt gat			929
Arg Leu Met Ser Gly Lys Gln Ala Ala Ile Ile Lys Ala Val Asp			
270	275	280	
tca aag tac acg gcc att ccc att gtg ggg cag gtc ttc cag agc cac			977
Ser Lys Tyr Thr Ala Ile Pro Ile Val Gly Gln Val Phe Gln Ser His			
285	290	295	
tgt aaa gga tgt cct tct ctc tcg gag ctc tgg cgg tcc acc agg aaa			1025
Cys Lys Gly Cys Pro Ser Leu Ser Glu Leu Trp Arg Ser Thr Arg Lys			
300	305	310	
tac ctg cag cct gac aac ctt tcc aag gct gag gct gtc aga aac ttc			1073
Tyr Leu Gln Pro Asp Asn Leu Ser Lys Ala Glu Ala Val Arg Asn Phe			
315	320	325	
ctg gcc ttc att cag cac ctc agg act gcg aag aaa gaa gag atc ctt			1121
Leu Ala Phe Ile Gln His Leu Arg Thr Ala Lys Lys Glu Glu Ile Leu			
330	335	340	345
caa ata cta aag atg gaa aat aag gaa gta tta cct cag ctg gtg gat			1169
Gln Ile Leu Lys Met Glu Asn Lys Glu Val Leu Pro Gln Leu Val Asp			
350	355	360	
gct gtc acc tct gct cag acc tca gac tca tta gaa gcc att ttg gac			1217
Ala Val Thr Ser Ala Gln Thr Ser Asp Ser Leu Glu Ala Ile Leu Asp			
365	370	375	
ttt ttg gat ttc aaa agt gac agc agc att atc ctc cag gag agg ttt			1265
Phe Leu Asp Phe Lys Ser Asp Ser Ser Ile Ile Leu Gln Glu Arg Phe			
380	385	390	
ctc tat gcc tgt gga ttt gct tct cat ccc aat gaa gaa ctc ctg aga			1313
Leu Tyr Ala Cys Gly Phe Ala Ser His Pro Asn Glu Glu Leu Leu Arg			
395	400	405	
gcc ctc att agt aag ttc aaa ggt tct att ggt agc agt gac atc aga			1361
Ala Leu Ile Ser Lys Phe Lys Gly Ser Ile Gly Ser Ser Asp Ile Arg			
410	415	420	425
gaa act gtt atg atc atc act ggg aca ctt gtc aga aag ttg tgt cag			1409
Glu Thr Val Met Ile Ile Thr Gly Thr Leu Val Arg Lys Leu Cys Gln			
430	435	440	
aat gaa ggc tgc aaa ctc aaa gca gta gtg gaa gct aag aag tta atc			1457
Asn Glu Gly Cys Lys Leu Lys Ala Val Val Glu Ala Lys Lys Leu Ile			
445	450	455	
ctg gga gga ctt gaa aaa gca gag aaa aaa gag gac acc agg atg tat			1505
Leu Gly Gly Leu Glu Lys Ala Glu Lys Lys Glu Asp Thr Arg Met Tyr			
460	465	470	

475	480	485	
ctg aag tat gca gaa gca gga gaa ggg ccc atc agc cac ctg gct acc Leu Lys Tyr Ala Glu Ala Gly Glu Gly Pro Ile Ser His Leu Ala Thr 490 495 500 505			1601
act gct ctc cag aga tat gat ctc cct ttc ata act gat gag gtg aag Thr Ala Leu Gln Arg Tyr Asp Leu Pro Phe Ile Thr Asp Glu Val Lys 510 515 520			1649
aag acc tta aac aga ata tac cac caa aac cgt aaa gtt cat gaa aag Lys Thr Leu Asn Arg Ile Tyr His Gln Asn Arg Lys Val His Glu Lys 525 530 535			1697
act gtg cgc act gct gca gct gct atc att tta aat aac aat cca tcc Thr Val Arg Thr Ala Ala Ala Ile Ile Leu Asn Asn Asn Pro Ser 540 545 550			1745
tac atg gac gtc aag aac atc ctg ctg tct att ggg gag ctt ccc caa Tyr Met Asp Val Lys Asn Ile Leu Leu Ser Ile Gly Glu Leu Pro Gln 555 560 565			1793
gaa atg aat aaa tac atg ctc gcc att gtt caa gac atc cta cgt ttg Glu Met Asn Lys Tyr Met Leu Ala Ile Val Gln Asp Ile Leu Arg Leu 570 575 580 585			1841
gaa atg cct gca agc aaa att gtc cgt cga gtt ctg aag gaa atg gtc Glu Met Pro Ala Ser Lys Ile Val Arg Arg Val Leu Lys Glu Met Val 590 595 600			1889
gct cac aat tat gac cgt ttc tcc agg agt gga tct tct tct gcc tac Ala His Asn Tyr Asp Arg Phe Ser Arg Ser Gly Ser Ser Ala Tyr 605 610 615			1937
act ggc tac ata gaa cgt agt ccc cgt tcg gca tct act tac agc cta Thr Gly Tyr Ile Glu Arg Ser Pro Arg Ser Ala Ser Thr Tyr Ser Leu 620 625 630			1985
gac att ctc tac tcg ggt tct ggc att cta agg aga agt aac ctg aac Asp Ile Leu Tyr Ser Gly Ser Gly Ile Leu Arg Arg Ser Asn Leu Asn 635 640 645			2033
atc ttt cag tac att ggg aag gct ggt ctt cac ggt agc cag gtg gtt Ile Phe Gln Tyr Ile Gly Lys Ala Gly Leu His Gly Ser Gln Val Val 650 655 660 665			2081
att gaa gcc caa gga ctg gaa gcc tta atc gca gcc acc cct gac gag Ile Glu Ala Gln Gly Leu Glu Ala Leu Ile Ala Ala Thr Pro Asp Glu 670 675 680			2129
ggg gag gag aac ctt gac tcc tat gct ggt atg tca gcc atc ctc ttt Gly Glu Glu Asn Leu Asp Ser Tyr Ala Gly Met Ser Ala Ile Leu Phe 685 690 695			2177
atc att ctc aca gca cct gtc acc ttt ttc aac gga tac act dat tta			2225



gaagggacaa ggctttaaa agacttgtt a cccaaacttca agaattaata tttatgtctc 3341  
tggttattgtt agtttaagc cttaaggtag aaggcacata gaaataacat c 3392

<210> 4  
<211> 18  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> PCR Primer

<400> 4  
cgtgggctac cgcatatcc 18

<210> 5  
<211> 22  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> PCR Primer

<400> 5  
tcatcatcac catcaggatt cc 22

<210> 6  
<211> 27  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> PCR Probe

<400> 6  
tccaacgtgg atgtggcctt actatgg 27

<210> 7  
<211> 19  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> PCR Primer

<400> 7  
gaaggtgaag gtcggagtc 19

<210> 8  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> PCR Primer

<210> 9  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> PCR Probe

<400> 9  
 caagcttccc gttctcagcc 20

<210> 10  
 <211> 2878  
 <212> DNA  
 <213> Mus musculus

<220>  
 <221> CDS  
 <222> (25) ... (2709)

<400> 10  
 ctggatgtgg cagagggagc cagc atg atc ctc ttg gca gtg ctt ttt ctc 51  
 Met Ile Leu Leu Ala Val Leu Phe Leu  
 1 5

tgc ttc ttc tcc tcc tac tct gct tcc gtt aaa ggt cac aca act ggc 99  
 Cys Phe Phe Ser Ser Tyr Ser Ala Ser Val Lys Gly His Thr Thr Gly  
 10 15 20 25

ctc tca tta aat aat gag cgg cta tac aag ctc acg tac tcc act gaa 147  
 Leu Ser Leu Asn Asn Glu Arg Leu Tyr Lys Leu Thr Tyr Ser Thr Glu  
 30 35 40

gtg ttt ctt gat ggg ggc aaa gga aaa ccg caa gac agc gtg ggc tac 195  
 Val Phe Leu Asp Gly Gly Lys Pro Gln Asp Ser Val Gly Tyr  
 45 50 55

aaa atc tca tct gat gtg gac gtt gtg tta ctg tgg agg aat cct gat 243  
 Lys Ile Ser Ser Asp Val Asp Val Val Leu Leu Trp Arg Asn Pro Asp  
 60 65 70

ggt gat gat gat caa gtg atc caa gtc acg ata aca gct gtt aac gtt 291  
 Gly Asp Asp Asp Gln Val Ile Gln Val Thr Ile Thr Ala Val Asn Val  
 75 80 85

gaa aat gcg ggt caa cag aga ggc gag aag agc atc ttc cag ggc aaa 339  
 Glu Asn Ala Gly Gln Gln Arg Gly Glu Lys Ser Ile Phe Gln Gly Lys  
 90 95 100 105

agt aca cct aag atc ata ggg aag gac aac ctg gag gct ctg cag aga 387  
 Ser Thr Pro Lys Ile Ile Gly Lys Asp Asn Leu Glu Ala Leu Gln Arg  
 110 115 120

ccc ata ctt ctt cat cta atc cca aaa aac atc aac aac ttc tac tcc 435

tat gaa aac gag cca gtg ggc ata gaa aat ctc aag aga ggc ttg gct		483	
Tyr Glu Asn Glu Pro Val Gly Ile Glu Asn Leu Lys Arg Gly Leu Ala			
140	145	150	
agc tta ttc cag atg cag cta agc tct gga act acc aac gag gta gat		531	
Ser Leu Phe Gln Met Gln Leu Ser Ser Gly Thr Thr Asn Glu Val Asp			
155	160	165	
atc tct ggg gat tgt aaa gtg acc tac caq gcc caa caa gac aaa gtg		579	
Ile Ser Gly Asp Cys Lys Val Thr Tyr Gln Ala Gln Gln Asp Lys Val			
170	175	180	185
gtc aaa att aag gct ctg gat aca tgc aaa att gag cgg tct gga ttt		627	
Val Lys Ile Lys Ala Leu Asp Thr Cys Lys Ile Glu Arg Ser Gly Phe			
190	195	200	
aca acg gca aac cag gtg ctg ggc gtc agt tca aaa gcc aca tct gtc		675	
Thr Thr Ala Asn Gln Val Leu Gly Val Ser Ser Lys Ala Thr Ser Val			
205	210	215	
act acc tac aag ata gag gac agc ttt gtc acc qct qtq ctt qca gaa		723	
Thr Thr Tyr Lys Ile Glu Asp Ser Phe Val Thr Ala Val Leu Ala Glu			
220	225	230	
gag acc agg gct ttt gcc ttg aac ttc caa caa acc ata gca gga aaa		771	
Glu Thr Arg Ala Phe Ala Leu Asn Phe Gln Gln Thr Ile Ala Gly Lys			
235	240	245	
ata gtg tca aag cag aaa ttg gag ctg aag aca act gaa gcc ggc cca		819	
Ile Val Ser Lys Gln Lys Leu Glu Leu Lys Thr Thr Glu Ala Gly Pro			
250	255	260	265
agg atg atc ccc ggg aag caa gtg gca ggt gta att aaa gca gtt gat		867	
Arg Met Ile Pro Gly Lys Gln Val Ala Gly Val Ile Lys Ala Val Asp			
270	275	280	
tcc aaa tac aaa gcc att ccc att gtg gga cag gtc ctc gag cgt gtc		915	
Ser Lys Tyr Lys Ala Ile Pro Ile Val Gly Gln Val Leu Glu Arg Val			
285	290	295	
tgc aaa gga tgc cct tct ctg gcg gag cac tgg aag tcc atc aga aag		963	
Cys Lys Gly Cys Pro Ser Leu Ala Glu His Trp Lys Ser Ile Arg Lys			
300	305	310	
aac ctg gag cct gaa aac ctg tcc aag gcc gag gct gtc cag agc ttc		1011	
Asn Leu Glu Pro Glu Asn Leu Ser Lys Ala Glu Ala Val Gln Ser Phe			
315	320	325	
ctg gcc ttc atc cag cac ctc cg <sup>g</sup> act tcg agg aga gaa gag atc ctc		1059	
Leu Ala Phe Ile Gln His Leu Arg Thr Ser Arg Arg Glu Glu Ile Leu			
330	335	340	345
cag att ctg aag gca gag aag aaa gaa gtg ctc cct cag ctg gtg gat		1107	
Gln Ile Leu Ile Gln Ala Glu Ile Ile Gln Val Leu Pro Gln Leu Val Asp			

gcc gtc acc tct gct cag act cca gac tcg cta gaa gcc atc ctg gac Ala Val Thr Ser Ala Gln Thr Pro Asp Ser Leu Glu Ala Ile Leu Asp 365	370	375	1155	
ttt ttg gat ttc aaa agt gac agc agt atc ata ctc cag gaa agg ttc Phe Leu Asp Phe Lys Ser Asp Ser Ser Ile Ile Leu Gln Glu Arg Phe 380	385	390	1203	
ctc tat gcc tgt ggc ttt gcc acc cac cct gat gaa gaa ctc cta cga Leu Tyr Ala Cys Gly Phe Ala Thr His Pro Asp Glu Glu Leu Leu Arg 395	400	405	1251	
gcc ctc ctt agt aag ttc aaa ggt tcc ttt gca agc aac gac atc aga Ala Leu Leu Ser Lys Phe Lys Gly Ser Phe Ala Ser Asn Asp Ile Arg 410	415	420	425	1299
gag tcg gtt atg atc atc att gga gcc cta gtc agg aag ctg tgt cag Glu Ser Val Met Ile Ile Gly Ala Leu Val Arg Lys Leu Cys Gln 430	435	440	1347	
aat gaa ggc tgc aag ctc aag gca gtg gtg gaa gct aag aag ctg atc Asn Glu Gly Cys Lys Leu Lys Ala Val Val Glu Ala Lys Lys Leu Ile 445	450	455	1395	
ctg gga gga ctt gaa aaa cca gag aag aaa gaa gac acc aca atg tac Leu Gly Gly Leu Glu Lys Pro Glu Lys Lys Glu Asp Thr Thr Met Tyr 460	465	470	1443	
ctg ctg gcc ctg aag aat gcc ttg ctt ccc gaa ggc atc ccg ctc ctt Leu Leu Ala Leu Lys Asn Ala Leu Leu Pro Glu Gly Ile Pro Leu Leu 475	480	485	1491	
ctg aag tat gct gag gct gga gaa ggg ccc gtc agc cac ctg gcc acc Leu Lys Tyr Ala Glu Ala Gly Glu Gly Pro Val Ser His Leu Ala Thr 490	495	500	505	1539
act gtt ctc cag aga tac gat gtc tcc ttc atc aca gat gag gtg aag Thr Val Leu Gln Arg Tyr Asp Val Ser Phe Ile Thr Asp Glu Val Lys 510	515	520	1587	
aag acc ttg aac agg ata tac cac cag aat cgt aag gtt cat gag aag Lys Thr Leu Asn Arg Ile Tyr His Gln Asn Arg Lys Val His Glu Lys 525	530	535	1635	
acg gtg cgc aca act gcc gct gct gtc atc tta aag aac cca tcc tac Thr Val Arg Thr Thr Ala Ala Val Ile Leu Lys Asn Pro Ser Tyr 540	545	550	1683	
atg gat gtg aag aac atc ctg ctg tcc att ggg gaa ctc ccg aaa gag Met Asp Val Lys Asn Ile Leu Leu Ser Ile Gly Glu Leu Pro Lys Glu 555	560	565	1731	
atg aac aaa tac atg ctc acc gtt gtg caa gac atc ctg cat ttt gaa Met Asn Lys Tyr Met Leu Thr Val Val Gln Asp Ile Leu His Phe Glu 570	575	580	585	1779

Met Pro Ala Ser Lys Met Ile Arg Arg Val Leu Lys Glu Met Ala Val			
590	595	600	
cac aat tat gac cgt ttc tcc aag agt gga tcc tct tct gcc tat act		1875	
His Asn Tyr Asp Arg Phe Ser Lys Ser Gly Ser Ser Ala Tyr Thr			
605	610	615	
ggc tac gta gaa cgt agc ccc cgt gca gcg tcc aca tac agc ctt gac		1923	
Gly Tyr Val Glu Arg Ser Pro Arg Ala Ala Ser Thr Tyr Ser Leu Asp			
620	625	630	
atc ctt tac tct ggc tct ggc att ctg agg aga agt aac ctg aac atc		1971	
Ile Leu Tyr Ser Gly Ser Gly Ile Leu Arg Arg Ser Asn Leu Asn Ile			
635	640	645	
tcc cag tac atc aaa gga aca gag ctt cat ggt agt cag gtg gtg att		2019	
Phe Gln Tyr Ile Lys Gly Thr Glu Leu His Gly Ser Gln Val Val Ile			
650	655	660	665
gaa gcc caa ggg ctg gaa ggc tta att gca gcc act cct gat gaa gga		2067	
Glu Ala Gln Gly Leu Glu Gly Leu Ile Ala Ala Thr Pro Asp Glu Gly			
670	675	680	
gag gag aac ctt gac tct tat gct ggc atg tca gcc atc ctg ttt gat		2115	
Glu Glu Asn Leu Asp Ser Tyr Ala Gly Met Ser Ala Ile Leu Phe Asp			
685	690	695	
gtt cag ctt agg cct gtc aca ttt ttt aat gga tac agt gat ttg atg		2163	
Val Gln Leu Arg Pro Val Thr Phe Phe Asn Gly Tyr Ser Asp Leu Met			
700	705	710	
tcc aaa atg ctg tcg gca tcc ggc gac cct gtc agc gtg gtg aaa ggg		2211	
Ser Lys Met Leu Ser Ala Ser Gly Asp Pro Val Ser Val Val Lys Gly			
715	720	725	
ctt att ctg tta ata gac cat tct cag gat att cag ctg caa tct gga		2259	
Leu Ile Leu Leu Ile Asp His Ser Gln Asp Ile Gln Leu Gln Ser Gly			
730	735	740	745
cta aag gcc aat atg gag atc cag ggt ggt cta gct att gat att tct		2307	
Leu Lys Ala Asn Met Glu Ile Gln Gly Gly Leu Ala Ile Asp Ile Ser			
750	755	760	
ggt tca atg gaa ttc agt ctg tgg tat cgc gag tct aaa acc cga gtg		2355	
Gly Ser Met Glu Phe Ser Leu Trp Tyr Arg Glu Ser Lys Thr Arg Val			
765	770	775	
aaa aat cgg gtg gct gtg gtg ata acc agc gac gtc aca gtg gat gcc		2403	
Lys Asn Arg Val Ala Val Val Ile Thr Ser Asp Val Thr Val Asp Ala			
780	785	790	
tct ttt gtg aaa gct ggt ctg gaa agc aga gcg gag aca gag gct ggg		2451	
Ser Phe Val Lys Ala Gly Leu Glu Ser Arg Ala Glu Thr Glu Ala Gly			
795	800	805	

810	815	820	825	
tgc atg cag atg gac aag gct gaa gcc cca ctc agg caa ttc gag aca Cys Met Gln Met Asp Lys Ala Glu Ala Pro Leu Arg Gln Phe Glu Thr 830				2547
aag tat gaa agg cta tct aca ggc agg gga tat gtc tct cgg aga aga Lys Tyr Glu Arg Leu Ser Thr Gly Arg Gly Tyr Val Ser Arg Arg Arg 845				2595
aaa gag agc cta gtg gcc gga tgt gaa ctc ccc ctc cat caa cag aac Lys Glu Ser Leu Val Ala Gly Cys Glu Leu Pro Leu His Gln Gln Asn 860				2643
tct gag atg tgc aac gtg gta ttc cca cct cag cca gaa agc gat aac Ser Glu Met Cys Asn Val Val Phe Pro Pro Gln Pro Glu Ser Asp Asn 875				2691
tcc ggt gga tgg ttt tga ttcccggtggg ttcccttcca ccagaacgat Ser Gly Gly Trp Phe 890				2739
atgctatgac gtgcctgacc cttgctctct gagagcacag tgtttacata tttacctgta tttaagatgt ttgtaaagag cagtggagaa cttcagttga ttaaagttga acctattcag gagaagaccc acagtgtcc				2799 2859 2878
<210> 11				
<211> 18				
<212> DNA				
<213> Artificial Sequence				
<220>				
<223> PCR Primer				
<400> 11 gagcggtctg gatttaca				
<210> 12				
<211> 24				
<212> DNA				
<213> Artificial Sequence				
<220>				
<223> PCR Primer				
<400> 12 a <del>g</del> gttagtgac agatgtggct tttg				
<210> 13				
<211> 23				
<212> DNA				
<213> Artificial Sequence				
<220>				
<223> PCR Primer				

caaaccaggt gctgggcgtc agt 23  
<210> 14  
<211> 20  
<212> DNA  
<213> Artificial Sequence  
  
<220>  
<223> PCR Primer  
  
<400> 14  
ggcaaattca acggcacagt 20  
<210> 15  
<211> 20  
<212> DNA  
<213> Artificial Sequence  
  
<220>  
<223> PCR Primer  
  
<400> 15  
gggtctcgct cctggaagat 20  
<210> 16  
<211> 27  
<212> DNA  
<213> Artificial Sequence  
  
<220>  
<223> PCR Probe  
  
<400> 16  
aaggccgaga atgggaagct tgtcatc 27  
<210> 17  
<211> 20  
<212> DNA  
<213> Artificial Sequence  
  
<220>  
<223> Antisense Oligonucleotide  
  
<400> 17  
cagtgcccaag cttaggagtca 20  
<210> 18  
<211> 20  
<212> DNA  
<213> Artificial Sequence  
  
<220>  
<223> Antisense Oligonucleotide  
  
-> 400 > 18

<210> 19  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 19  
tcatattgac cagcaatcct 20

<210> 20  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 20  
ccagttgtgt gacctttaac 20

<210> 21  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 21  
acgtgagctt gtacagccgg 20

<210> 22  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 22  
gcggtagccc acgctgtctt 20

<210> 23  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 23  
gattcctcca tagtaaggcc 20

<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 24  
gattagatga aggagcgtag 20

<210> 25  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 25  
gtggttccag agcttaactg 20

<210> 26  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 26  
aggtgttgac agatgttagct 20

<210> 27  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 27  
gctgcagcct gctttccaga 20

<210> 28  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 28  
acagtggctc tggaaagacct 20

<210> 29  
<211> 20

<220>  
<223> Antisense Oligonucleotide

<400> 29  
tggtgacccg ccagagctcc 20

<210> 30  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 30  
gagggtgacag catccaccag 20

<210> 31  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 31  
atggcttcta atgagtctga 20

<210> 32  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 32  
cctggaggat aatgctgctg 20

<210> 33  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 33  
agtgtccccag tcatgtatcat 20

<210> 34  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 34  
agcagataca tcctgggtgc 20

<210> 35  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 35  
cccttctcct gcttctgcat 20

<210> 36  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 36  
gaggcgtgg agccaggtgg 20

<210> 37  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 37  
taaggtcttc ttcacacctat 20

<210> 38  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 38  
gcagctgcag cagtgcgcac 20

<210> 39  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>

<400> 39  
cttgacgtcc atgttaggatg 20

<210> 40  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 40  
ctatgttagcc agtgttaggca 20

<210> 41  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 41  
cgagtagaga atgtcttaggc 20

<210> 42  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 42  
taccgtgaag accagccttc 20

<210> 43  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 43  
attaaggctt ccagtccttg 20

<210> 44  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<210> 45  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 45  
gataccacaa gctaaaactcc 20

<210> 46  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 46  
gaggaggcca ctgtgatgtc 20

<210> 47  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 47  
gtactggttt ccaggccagc 20

<210> 48  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 48  
gcttcatcct tgtccatctg 20

<210> 49  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 49  
caactaaaaat actataccac 20

<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 50  
aatatcacag gtcagttca 20

<210> 51  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 51  
catgccacat tgtgtccctt 20

<210> 52  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 52  
cgctgtgctc tcagagagca 20

<210> 53  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 53  
gtagcatact gcatataccc 20

<210> 54  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 54  
gatgattcaa aatgacgctg 20

~ ~ ~ ~ ~

<213> Artificial Sequence  
<220>  
<223> Antisense Oligonucleotide  
  
<400> 55  
gatttgagag aggtataagt  
  
<210> 56  
<211> 20  
<212> DNA  
<213> Artificial Sequence  
  
<220>  
<223> Antisense Oligonucleotide  
  
<400> 56  
gagaataact attctgactg  
  
<210> 57  
<211> 20  
<212> DNA  
<213> Artificial Sequence  
  
<220>  
<223> Antisense Oligonucleotide  
  
<400> 57  
gagcttcata tacatttgatc  
  
<210> 58  
<211> 20  
<212> DNA  
<213> Artificial Sequence  
  
<220>  
<223> Antisense Oligonucleotide  
  
<400> 58  
cccggtcatgc ttaaggaagt  
  
<210> 59  
<211> 20  
<212> DNA  
<213> Artificial Sequence  
  
<220>  
<223> Antisense Oligonucleotide  
  
<400> 59  
atgtgccttc taccttaagg  
  
<210> 60  
<211> 20  
<212> DNA

20

20

20

20

20

<220>  
<223> Antisense Oligonucleotide

<400> 60  
gctccctctg ccacatccag 20

<210> 61  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 61  
gatcatgctg gctccctctg 20

<210> 62  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 62  
gagtagtga gcttgtata 20

<210> 63  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 63  
gtagccccacg ctgtcttgcg 20

<210> 64  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 64  
catcaccatc aggattcc 20

<210> 65  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<400> 65  
gccctggaag atgctttct 20  
  
<210> 66  
<211> 20  
<212> DNA  
<213> Artificial Sequence  
  
<220>  
<223> Antisense Oligonucleotide  
  
<400> 66  
gcctccagg tgccttccc 20  
  
<210> 67  
<211> 20  
<212> DNA  
<213> Artificial Sequence  
  
<220>  
<223> Antisense Oligonucleotide  
  
<400> 67  
tagaactcct tgaccttccc 20  
  
<210> 68  
<211> 20  
<212> DNA  
<213> Artificial Sequence  
  
<220>  
<223> Antisense Oligonucleotide  
  
<400> 68  
tggaataagc tagccaagcc 20  
  
<210> 69  
<211> 20  
<212> DNA  
<213> Artificial Sequence  
  
<220>  
<223> Antisense Oligonucleotide  
  
<400> 69  
ccccagatata tctacacctcg 20  
  
<210> 70  
<211> 20  
<212> DNA  
<213> Artificial Sequence  
  
<220>  
<223> Antisense Oligonucleotide

cccagcacct ggtttgcgt 20  
<210> 71  
<211> 20  
<212> DNA  
<213> Artificial Sequence  
  
<220>  
<223> Antisense Oligonucleotide  
  
<400> 71  
ccctggtctc ttctgcaagg 20  
<210> 72  
<211> 20  
<212> DNA  
<213> Artificial Sequence  
  
<220>  
<223> Antisense Oligonucleotide  
  
<400> 72  
cacctgccac ttgcttcccc 20  
<210> 73  
<211> 20  
<212> DNA  
<213> Artificial Sequence  
  
<220>  
<223> Antisense Oligonucleotide  
  
<400> 73  
gctcgaggac ctgtccacaa 20  
<210> 74  
<211> 20  
<212> DNA  
<213> Artificial Sequence  
  
<220>  
<223> Antisense Oligonucleotide  
  
<400> 74  
ttccagtgct ccgccagaga 20  
<210> 75  
<211> 20  
<212> DNA  
<213> Artificial Sequence  
  
<220>  
<223> Antisense Oligonucleotide

:000 - 75

<210> 76  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 76  
cagaggtgac ggcatccacc 20

<210> 77  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 77  
cctggaggat gatactgctg 20

<210> 78  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 78  
ctctgatgtc gttgcttgca 20

<210> 79  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 79  
attctgacac agcttcctga 20

<210> 80  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 80  
cccaggatca gcttcttagc 20

<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 81  
cagcctcagc atacttcaga 20

<210> 82  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 82  
gtggctgacg ggcccttctc 20

<210> 83  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 83  
acgattctgg tggtatatcc 20

<210> 84  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 84  
cagcagcggc agttgtgcgc 20

<210> 85  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 85  
tgcacacaacgg tgagcatgta 20

<210> 86  
<211> 20

<220>  
<223> Antisense Oligonucleotide

<400> 86  
gccagtatag gcagaaggagg 20

<210> 87  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 87  
aaggctgtat gtggacgctg 20

<210> 88  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 88  
cagaatgcga gagccagagt 20

<210> 89  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 89  
ctgcaattaa gccttccagc 20

<210> 90  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 90  
ctctcccttca tcaggagtgg 20

<210> 91  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 91  
tgacatgccatgcataaggat 20

<210> 92  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 92  
cgctgacagg gtcggccggat 20

<210> 93  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 93  
ccctttcacc acgctgacag 20

<210> 94  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 94  
gaccacccttg gatctccata 20

<210> 95  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 95  
ctcgcgatac cacagactga 20

<210> 96  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>

<400> 96  
gttatcacca cagccacccg 20

<210> 97  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 97  
gaactccaggc ccagcctctg 20

<210> 98  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 98  
agccttgcgtcc atctgcatgc 20

<210> 99  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 99  
cacatccggc cactaggctc 20

<210> 100  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 100  
tctcagagtt ctgttgatgg 20

<210> 101  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

```
<210> 102
<211> 20
<212> DNA
<213> Artificial Sequence
```

<220>  
<223> Antisense Oligonucleotide

<400> 102  
actatqctct cagaqaqcaa

20

```
<210> 103  
<211> 20  
<212> DNA  
<213> Artificial Sequence
```

<220>  
<223> Antisense Oligonucleotide

<400> 103  
ggtctttctcc tqaatagtt

30

```
<210> 104
<211> 20
<212> DNA
<213> Artificial Sequence
```

<220>  
<223> Antisense Oligonucleotide

<400> 104  
qqccaaqttqt qtqaccttta

20

```
<210> 105
<211> 20
<212> DNA
<213> Artificial Sequence
```

<220>  
<223> Antisense Oligonucleotide

<400> 105  
catcaaqaaaa cacttcagto

20

```
<210> 106
<211> 20
<212> DNA
<213> Artificial Sequence
```

<220>  
<223> Antisense Oligonucleotide

<400> 106

<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 107  
ctgttatcgt gacttggatc 20

<210> 108  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 108  
gaagaagcat gggtctctgc 20

<210> 109  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 109  
ctatccccac tggctcgaaa 20

<210> 110  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 110  
tggtagttcc agagcttagc 20

<210> 111  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 111  
tggtaggtca ctttacaatc 20

<210> 112

<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 112  
atgtggcttt tgaactgacg 20

<210> 113

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 113  
tatctttagt gtagtgacag 20

<210> 114

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 114  
gcggtgacaa agctgtcctc 20

<210> 115

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 115  
gggcatcatt tgcagacacg 20

<210> 116

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 116  
cagcctcgcc cttggacagg 20

<210> 117

<211> 20

<212> DNA

<220>  
<223> Antisense Oligonucleotide

<400> 117  
gaaggccagg aagctctgga 20

<210> 118  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 118  
tagcgagtct ggagtctgag 20

<210> 119  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 119  
aatgatgtac ataaccgact 20

<210> 120  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 120  
gccttgagct tgcagcccttc 20

<210> 121  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 121  
ccagcaggtt catttgtggtg 20

<210> 122  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<400> 122  
tgaaggagac atcgtatctc 20

<210> 123  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 123  
accgtttct catgaacctt 20

<210> 124  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 124  
atgttcttca catccatgta 20

<210> 125  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 125  
atctccttga gaactcgacg 20

<210> 126  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 126  
ggtcataatt gtgaacagcc 20

<210> 127  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

caatcaccac ctgactacca 20

<210> 128  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 128  
tgaacatcaa acaggatggc 20

<210> 129  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 129  
ggtcttattaa cagaataaagc 20

<210> 130  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 130  
cagctgaata tcctgagaat 20

<210> 131  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 131  
gggttttaga ctcgcgatac 20

<210> 132  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 132

<210> 133  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 133  
gagaactgca ctgtggagat 20

<210> 134  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 134  
ctgcctgttag atagcctttc 20

<210> 135  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 135  
tgggaataacc acgttgacaca 20

<210> 136  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 136  
atacaggtaa atatgtaaac 20

<210> 137  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Antisense Oligonucleotide

<400> 137  
atcaactgaa gttctccact 20